

ABSTRACT

A set of volatile markers are determined which are characteristic of a particular condition or disease, and which will be found in the exhaled breath of a person or odor from other parts of a body or from an entity. These markers are detected in the breath odor or gaseous emanations from the body or entity noninvasively using a volatile substance detector of sufficient sensitivity, such as an artificial olfactory system. The detected marker data is processed in an artificial neural network/fuzzy filter system with an algorithm that intelligently adapts to the individual body or entity and also optionally (if necessary) with a correction algorithm to eliminate environmental and other erroneous contributions to the markers. The marker need only be as volatile as the sensitivity of the detector requires. Thus an ultrasensitive detector can detect a marker of very low volatility or concentration. Any number of markers may be used, depending on how well they correlate with the condition and how accurate a result is desired, i.e. general screening or accurate diagnosis and monitoring. The methodology and apparatus can be applied to many specific situations, including diagnosis of human medical conditions or diseases, e.g. diabetes or lung cancer, but is not even limited to living organisms. The condition of a non-living body or system can be detected, e.g. a leaking transformer, if it emanates detectable volatile markers or distinguishable odor signatures from a collection of markers.